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ABSTRACT

The influence of maternal use of verbs upon a child's developing rule system for verb usage was examined. Previously reported data (Brown, 1983) on mother-to-child speech were analyzed. Thirteen different contexts for verb use were identified. There was a close resemblance between the way the child and his mother distributed their uses of verbs. There was very little immediate imitation on the part of either mother or child. Apparently the child monitored his mother's use of verbs as an index of their potential for new constructions. It is suggested that the child compared a verb's privileges of occurrence with other items heard in a particular construction. The greater the degree of overlap, the more confident he was that it participates in the construction. As a result, verbs with a variety of heard uses were used with greater confidence by the child even in unheard contexts. A mechanism of this sort would allow for novelty of verb use even while the child was storing information about syntactic rules in his lexicon. (RW)

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Patterns of Verb Use in Mother and Child

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In language acquisition research, one can find a bewildering variety of answers to the fundamental question of how young children generalize syntactic rules, a question posed by any researcher interested in the nature and vocabulary of children's syntax. On the classic account, children "extract" the rules from the speech they hear, and then combine those rules with their own separate vocabulary list to generate novel utterances that they have never heard spoken. For instance, to produce a present progressive form of the verb, take any verb (presumably marked "V" in one's lexicon) and add the morphemes be and ing to it to arrive at

be + V + ing

As testimony to children's productivity, we have anecdotes of overextensions, e.g. comed, breaked and so on.

In contrast to that position, several others have argued that at least young children often have formulaic knowledge: rules that are acquired lexical item by lexical item rather than across whole categories at once (Braine, 1976; Kuczaj, 1982). Maratsos (1979) and Bowerman (1982) have each pointed out that some constructions are item specific even in the adult grammar, necessitating attention not only to the rules but also to the lexical items with which they have been heard. To use an example from Bowerman (1982), despite the similar meanings of verbs like rob and steal, one says

He robbed her of the gun

not

*He robbed the gun from her

yet the opposite pattern is true for steal. There is no passive form of verbs such as belong or have, and no transformed dative for announce or relay e.g.

*He announced her the results

Hence children would be wise to be cautious in extending rules beyond the evidence given (Baker, 1979).

A second problem with the classical position is how a child knows which items in his vocabulary are verbs, if the rule is defined in terms of abstract categories. Maratsos and Chalkley (1980) offer two alternatives: the first, which they reject, is that verbs are semantically defined for the child, perhaps as actions. The second alternative is that verbs are defined by sharing privileges of occurrence that are distinct from the privileges for other grammatical categories. Hence an item can enter into a new rule if there is sufficient overlap between its previously heard privileges of occurrence and those of other items whose participation in the construction has been witnessed. For instance, if the child wishes to say fixed, the deciding factor will be the similarity in behavior between the item fix and other items that he has heard in the regular past tense. The prediction that follows is that items heard in a variety of constructions might be extended to new

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constructions with more certainty than items heard only in a narrow set of grammatical contexts.

Unfortunately, there exist no data on how privileges of occurrence are distributed over items in the input that children receive. We have data on the frequency of particular verbs, we have data on the frequency of limited sets of grammatical contexts (Brown, 1973) but no information about the variety of use that different verbs receive, that is patterns of verb use in the input. My goal in the present research was to take a look at the contexts of use of particular verbs in parental speech, to discover whether some verbs occurred in a greater variety of contexts than others, and then to determine whether the child allowed those verbs different privileges of occurrence in his developing rule system.

Data Base

Transcripts of Adam and his mother (Brown, 1973) were used for this analysis. The transcripts had been collected in biweekly two-hour sessions in the home and consisted mostly of mother-child dialogue, with an occasional mother-researcher or child-researcher exchange. For present purpose only the mother's speech to the child was analyzed, but all of the child's output was used. The mother's speech from the first five sessions was analyzed, and Adam's speech from the first ten sessions. During these ten sessions, Adam's MLU ranged from 2.06 to 3.01 morphemes.

Coding and Analysis

By examining the transcripts, thirteen different "contexts" for verb use were identified, defined by their immediately adjacent morphemes. These were as follows:

1. DO + V
2. Unmarked V e.g. 1st or 2nd person present
3. Imperative V!
4. Infinitive to + V
5. Modal + V
6. Progressive BE + V + ing
7. Past V+ ed (or irregulars)
8. Present participle V+ ing
9. 3rd person present V+s
10. Future WILL + V
11. Perfect HAVE + V + en
12. Passive BE + V + en
13. Perfect participle V + en

A few extra contexts occurred rarely and could not be accomodated under this scheme e.g. let's V, but in general it proved to be a workable coding scheme especially for the adult. In the case of Adam, there were lots of uninflected verbs and sometimes the context could not distinguish his intent. Since the purpose of this study was to examine patterns of rule use, only verbs with the above characteristics were counted, that is, obligatory morphemes had to be supplied. It is nevertheless possible that category 2, for unmarked verbs, may be inflated in Adam's case, though every attempt was made to exclude unmarked

verbs that would have been inflected in the adult grammar.

The coding scheme resulted in two large matrices with contexts arrayed across the top and particular verbs down the side as illustrated in Table 1. To compare the two speakers, only those verbs used at least once by both Adam and his mother were selected, for a total of 81 different verbs out of a total of 160 possible verbs. A number of different measures were then derived to compare Adam and his mother in their patterns of verb use:

1. The number of different contexts in which each verb appeared for Adam (A1) and his mother (M1).
2. The frequency of each verb used by Adam (A2) and his mother (M2).
3. The number of different verbs used in each context by Adam (A3) and his mother (M3).
4. The frequency of each context in the mother's speech (M4).

To clarify the measures, compare the verbs BREAK and HAPPEN in Table 1. Although they are similar in frequency (M2), they are distributed quite differently across contexts (M1). The contexts of use are ordered according to measure M3, with 1 having the greatest variety of verbs participating in the construction, (N=65) and 13 the least (N=7).

Table 1

Contexts:	1	2	3	4	5	6	7	8	9	10	11	12	13	
Verbs:														
BREAK	1	6		2	1	6			4	2	13	5		M1=9;M2=40
HAPPEN						1	49		3	1				M1=4;M2=54

Results

Of the verbs in common to both, those in Adam's mother's speech participated in between 11 and 2 different constructions, while the same verbs entered between 8 and 1 different contexts in Adam's speech. When Adam's and his mother's verbs are ordered by measure 1, i.e. in terms of the variety of contexts in which they appear, the product moment correlation between the two lists is .657 ($p<.001$). However, that result may be inflated by the confounding with frequency: a verb that only appears 5 times in the transcripts does not have much opportunity to occur in a variety of contexts. Hence the more suitable analysis is a multiple regression analysis to partial out the effects of frequency, and determine whether the resemblance between mother and Adam still persists. Adam's verb use variety (A1) was treated as the dependent variable and the independent variables were the mother's verb use variety (M1), and the frequency measures (A2,M2). These variables taken together are a highly successful set of predictors of Adam's verb use variety (Multiple $R^2=.588$, $F=36.55$, $df=77$, $p=.0000$). Of these variables, Adam's frequency is understandably an excellent predictor of his verb use variety ($p=.000$), but his mother's frequency is not a predictor ($p=.455$). Most importantly, the way his mother distributes her uses of the verbs is an excellent predictor of Adam's own use ($p=.000$).

A similar multiple regression analysis was performed with the dependent variable being Adam's variety of verbs per context, (A3),

namely how varied the verbs were in each particular context. The mother's variety of verbs per context (M3) as well as her frequency of contexts (M4) were used as predictors, and the composite was very successful (Multiple R^2=.622,F=8.22,df=10,p=0077). However, only the mother's variety of verbs per context was a significant single predictor (p=.011), with maternal frequency being nonsignificant (p=.322).

Clearly, then, the pattern of use in the mother's speech is very closely mirrored in Adam's speech, with maternal frequency being comparatively insignificant in this process. However, the nature of this matching deserves further exploration: are both Adam and his mother reflecting the larger patterns to be found in the language as to how verbs are distributed, or is Adam finely tuned to his mother's perhaps idiosyncratic pattern, her idiolect? As a preliminary approach to this question, I have analyzed the first five transcripts of Eve (Brown, 1973), completing the coding of only her mother's speech. By comparing the two mothers, and by comparing Adam and this unacquainted adult, we can explore the determinants of Adam's patterns of verb use.

First, those verbs were selected that all three speakers used at least once, for a total of 61. It should be noted that this is a conservative approach, since the unique items shared by Adam and his mother are hence excluded. Product moment correlations among the variables reveal substantial similarity both between the two mothers (.56) and between Adam and the two mothers (.61 with his own mother; .46 with Eve's mother) on the variety of use variable. Evidently, at least in conversation with small children, there is considerable similarity in the adult language as to how verbs are distributed across contexts. But would any mother's speech suffice to predict Adam's use? To answer this question, a step-wise regression analysis was performed with Adam's variety of verb use (A1) as the dependent variable. In such an analysis, the independent variables are added one at a time in a prespecified order as long as they continue to add significantly to the predictive power of the preceding variables. As before, Adam's frequency and his mother's variety of use were added in the regression, but Eve's mother's variety and frequency measures failed to meet the criteria for inclusion. If Eve's mother's variety is prespecified to be the first variable, it is entered in the regression, but as soon as Adam's mother's variety is considered, that variable is chosen instead and Eve's mother's variety is removed from the equation. Evidently Adams' own mother is a significantly better predictor of his own pattern of verb use than an unacquainted mother. Note also that this result is despite the high similarity between the patterns of verb use in the speech of the two mothers and despite the exclusion of vocabulary items that are more common in Adam's home.

Discussion

There is evidently a close resemblance between this child and his mother in the way that they distribute their uses of verbs. Verbs that receive varied use in the mother's speech are used in a variety of contexts by the child. More restricted use in the mother's speech coincides with more restricted use in the child's speech. This matching

is greater than that predicted by the language as a whole, or even by the language of adults to small children, as shown by the superiority of Adam's mother over Eve's mother in predicting Adam's use. However, it is difficult without further work and replication of this finding to give a satisfactory account of the matching process. The measure that I have devised is a measure of variety of use, yet it does not reflect the particulars of how verbs are distributed across the contexts. For instance, Adam and his mother could both use a verb in six different contexts, yet the six uses might not overlap. Alternatively, the resemblance may arise simply because Adam uses only what he has heard his mother use. At best I am able to sketch out some broad alternatives, but present data can not decide among them.

First, consider the possibility that the resemblance arises because of imitation, either Adam imitating his mother or vice versa. My impression of the transcripts is that there is very little immediate imitation on the part of either mother or child, at least insufficient to account for these data. To quantify this impression, I superimposed the two matrices with the intention of assessing the degree of overlap relative to the potential for shared constructions. It is necessary to remember that there are 5 transcripts for the mother but ten for Adam, however. There are 530 cells of the matrix filled, out of a total of 1053 (81x13). Of these, 197 are jointly filled by Adam and his mother (37.2%), 291 are unique to the mother, and 42 unique to Adam. However, one should remember that these transcripts represent only a tiny portion of the discourse between these two speakers, so the unique utterances may be only unique within these samples. Furthermore, Adam's unique utterances are primarily uninflected forms of verbs which hardly represent novel overextensions. Nevertheless, it should be noted that children of comparable age and stage to this do produce novel verb uses. Our daughter Charlotte produced the forms "powing" (shooting an imaginary gun) and "fasting" (for running fast) well before she had 90% control over the progressive for real verbs. Samples of this sort simply do not answer the question of genuine novelty, for which precise control over the input is necessary. Hence it is possible that Adam is carefully monitoring the uses of particular verbs and staying close to the input in his own productions. However, immediate imitation does not seem to be a major process at work for this dyad.

As a second broad alternative, consider the proposal that rather than learning to mimic the particular uses that verbs receive, the child is monitoring these uses as an index of their potential for participation in new constructions, or, their prototypicality as verbs (de Villiers, 1980). In deciding whether a given item enters a construction, the child compares its privileges of occurrence with other items heard in that construction. The greater the degree of overlap, the more confident he is that it participates in the construction. As a result, verbs with a variety of heard uses are used with greater confidence by the child even in unheard contexts. The consequence would be a resemblance of the kind reported here, but it would be a resemblance of a more abstract nature than a direct storage of heard uses. A mechanism of this sort would allow for novelty of verb use

even while the child was storing information about syntactic rules in his lexicon. I propose this as a tentative bridge between the classical and the lexicalist approaches: some computational procedure must be operating across lexical items, and of all the potential sources of analogy across verbs, their behavior in sentences would seem to be the most fruitful basis for later creativity.

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